

Gender Difference in the Perceptions of Influence of Organizational Defensive Patterns: an Empirical Study in Hong Kong Transport Sector

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Abstract

The purpose of this paper is to investigate whether (1) male and female engineering staff in two transport companies have differences in the perception of influence of the organizational defensive patterns on learning of information and communication technology (ICT); and (2) skilled incompetence, organizational defensive routines and fancy footwork are less correlated with each other for female engineering staff than their male counterparts in two transport companies. Quantitative survey was employed in this study. Totally 200 engineering staff (159 male and 41 female) were selected from two companies. T-test and correlation analysis were used to test the hypotheses. The findings showed that (1) male and female engineering staff in two transport corporations had the different perceptions of influence of skilled incompetence, defensive routines and fancy footwork on learning of ICT; and (2) skilled incompetence, defensive routines and fancy footwork were less positively associated with each other for female engineering staff than their male counterparts in two transport corporations.

Keywords

Gender Difference; Engineering; Organizational Defensive Patterns

Introduction

The efficiency of business process [12] and the competitive advantage of an organization [21] can be improved by the adoption of information and communication technology (ICT). In addition, learning quickly is the key to success in organizations [16] and learning at all levels is essential for organizational survival [7]. However, organizational defensive patterns are generic to all human organizations [4] and they include three mechanisms: skilled incompetence, defensive routines and fancy footwork [4], [28]. Although change is naturally resisted in all

organizations [15], the adoption of information and communication technology (ICT) can assist in overcoming that resistance if implemented properly organization by opening communication channels and enhancing information stocks and flows [31].

Moreover, it has been traditionally perceived that engineering is unsuitable for women [27] and organizational learning issues have rarely been related to gender [24]. In this paper I would like to fill this research gap and I attempt to investigate the perceptions of influence of organizational defensive patterns on female engineering group of two Hong Kong transport companies where those companies adopted new ICT from other companies.

In this study, two transport corporations in Hong Kong, denoted as Company 1 and Company 2, were studied. As Company 1 and Company 2 tended to acquire new information and telecommunication technologies from other companies rather than to develop their own technologies, staff had to take seriously the job of continually initiating and adjusting to change [19]. In two companies, the female engineering staff was recruited and they were required to learn the new ICT, together with their male counterpart, to maintain their daily engineering jobs. However, the organizational defensive patterns would impede those staff to learn the new technologies from other companies. The purpose of my research is to investigate whether (1) male and female engineering staff in two transport companies have differences in the perception of influence of the organizational defensive patterns on learning of ICT; and (2) skilled incompetence, organizational defensive routines and fancy footwork are less correlated with each other for female engineering staff than their male counterparts in two

transport companies. Specifically, this study addresses the following questions: (1) Did male and female engineering staff in two transport companies have differences in the perception of influence of the organizational defensive patterns on learning of ICT? (2) Were skilled incompetence, organizational defensive routines and fancy footwork less correlated with each other for female engineering staff than their male counterparts in two transport companies? I attempt to answer these questions by undertaking quantitative surveys in each of the companies' engineering groups. The results indicated that (1) male and female engineering staff in two transport corporations had the different perceptions of influence of skilled incompetence, defensive routines and fancy footwork on learning of ICT; and (2) skilled incompetence, defensive routines and fancy footwork were less positively associated with each other for female engineering staff than their male counterparts in two transport corporations.

Literature Review

Women in engineering profession

There is a perception that engineering is a masculine profession and it is unsuitable for women. Their success has still been limited even various strategies have been used to try to increase the number of women entering engineering education and employment [27]. Different organizational barriers including few role models, exclusion from important networks, limited stretch assignments, gender stereotypes and the tug of dual-career families hinder women to advancement [14]. In order to gain male acceptance, women utilize the following coping strategies: acting like one of the boys, accepting gender discrimination, achieving a reputation, seeing more advantages than disadvantages and adopting an anti-woman approach [27].

Organizational Learning

Individual learning is distinct from organization learning [13] and it is necessary but insufficient to produce organizational learning. Organizational learning cannot be equated with individual learning processes and behaviors [28] and it is more than the sum of learning by individual members of the organization [30], [28].

There are many definitions of organizational learning. Argyris and Schön [3] define organizational learning as 'a process in which members of an organization

detect error or anomaly and correct it by restructuring organizational theory of action, imbedding the results of their inquiry in organizational maps and images'. Likewise, Duncan and Weiss [11] define organizational learning as 'the process within the organization by which knowledge about action/outcome relationships and the effect on the environment on these relationships is developed'. Similarly, Heracleous [17] defines organizational learning as 'the process by which organizations change their cultures and systems in relation to market conditions, and is about having the appropriate culture, structure, and systems to encourage people to develop continually and share knowledge with others'. Then Probst and Büchel [28] define organizational learning as 'the process by which the organization's knowledge and value base changes, leading to improved problem-solving ability and capacity for action'.

As most knowledge exists external to the organization, organizational learning emphasize on three factors: (1) organizational action; (2) organizational interaction with the environment; and (3) changes in organizational modeling of the environment [25]. Organizational learning involves: (1) institutionalizing experience [30]; (2) sharing assumptions [30]; (3) developing knowledge of action-outcome relationships [30]; and (4) the ability of the organization to position itself vis-à-vis the environment [13]. In addition, organizational learning can also respond to contextual factors such as organizational structure, strategy, culture and environment [13].

Organizational defensive patterns

According to Argyris and Schön [3], 'limited learning systems' exist due to the failure of many firms to achieve a balance between the preservation of existing knowledge structures and the necessary degree of unlearning. These systems conceal errors which can be created by inconsistencies and making attempts at disguise. These tactics can be referred to organizational defensive patterns [3], [28]. Organizational defensive patterns include three mechanisms: skilled incompetence, defensive routines and fancy footwork [4], [28]. Therefore, organizational defensive patterns can be one of the contextual factors which occur in an organization. The following sections will discuss the elements of these patterns.

Skilled incompetence [1], [4], [28], [18], organizational defensive routines [4], [28], [20] and fancy footwork [4],

[28] are three mechanisms which together form organizational defensive patterns, and they are the main barriers to higher-level learning [4], [28]. Organizational defensive patterns, in varying degrees, impede the learning in all human organizations, including private and public organizations, trade unions, voluntary organizations, universities and schools, as well as families [4].

1) *Skilled incompetence*

People like to be praised when they have done well and they do not like losing control over their actions. There is always a possibility of losing control or of not being praised when a threatening or painful situation arises. Most people therefore follow a theory of action and they must stay in control, and remain master of the situation [4]. The mechanism that people use to stay in control or to conceal painful and threatening situations is called "skilled incompetence" [1], [4]. Explanation, distortions, inexactitudes, omissions, excuses are common strategies to be used to keep what one has. Skilled incompetence is the use of such strategies based on theories of action aimed at avoiding loss of face [28]. Besides, the top management teams operate within their own silos and they are like a group of fiefdoms that refuse to cooperate effectively for fear that they will lose power [5].

2) *Organizational defensive routines*

Senior managers like to avoid potentially threatening and embarrassing issues [5], they also avoid public discussion and scrutiny on perceived personal matters such as fears, attitudes, weaknesses and performance [29]. Mechanisms that are used to avoid such surprising, threatening, or embarrassing issues can be referred to organizational defensive routines [2], [28], [20], [29]. Defensive routines can create errors in the behavior of individuals and groups. These mechanisms prevent the likelihood of existing structures from breaking down [4]. Even any attempt to prevent the mechanism from operating can strengthen these structures [2], [4].

3) *Fancy footwork*

Fancy footwork refers to the behaviors which enable people to be blind towards inconsistencies in their own actions or to make others responsible for them. These behaviors embrace a variety of strategies for concealing the truth [4]. Fancy footwork is also the use of all mechanisms which rely on protective, defensive argumentation to deny mistakes or to conceal them from the people who made them and from those in

authority [28].

Organizational learning related to women

Although the concept of organizational learning has a long lineage in the management literature, few studies related organizational learning to women [23]. One of the first to analyze the organizational learning regarding to the women's issue was Post and Mellis in 1978 [26], in their article *Corporate Responsiveness and Organizational Learning*.

Afterwards, few researchers have done the organizational learning studies related to women. Some of examples will be addressed in the following. Female owner-managers like to empower organizational learning and knowledge transfer [8]. Female owner managers had adopted "masculine" management styles, shows their preference for the features and processes of organizational learning and women like to use organizational learning as a way to innovate, deal with change and develop than their male counterparts [23]. Organizational learning is essential to support for female networking which can develop competitive advantage [24].

Based on the above evidence, I predict that:

Hypothesis 1a: Female engineering staff and male engineering staff have differences in the perception of influence of skilled incompetence on learning of ICT.

Hypothesis 1b: Female engineering staff and male engineering staff have differences in the perception of influence of organizational defensive routines on learning of ICT.

Hypothesis 1c: Female engineering staff and male engineering staff have differences in the perception of influence of fancy footwork on learning of ICT.

In addition, skilled incompetence, organizational defensive routines and fancy footwork coexist and reinforce each other; therefore they form organizational defensive patterns once they are in existence [4]. Therefore, I hypothesize that:

Hypothesis 2a: Skilled incompetence is less positively correlated with organizational defensive routines for female engineering staff than male engineering staff.

Hypothesis 2b: Skilled incompetence is less positively correlated with fancy footwork for female engineering staff than male engineering

staff.

Hypothesis 2c: Organizational defensive routines are less positively correlated with fancy footwork for female engineering staff than male engineering staff.

Method

In this study, I have utilized quantitative survey based data of employees to test the hypotheses stated above. The research was carried out in two public transport companies in Hong Kong, namely Company 1 and Company 2. Company 1 operates the cross-boundary and inter-city transport services while Company 2 operates the domestic transport service. The engineering managers, engineers, and their support team members were chosen as the sample in each selected company and a purposive random sampling method was selected for heterogeneity, thus maximizing the representativeness of results.

The actual survey was conducted by internal mail to the respondents. The respondents were contacted individually and a questionnaire contained a covering letter explaining the purpose of the research. The questionnaire was completed on average within 15 minutes in the absence of the researcher. Subsequently, 240 questionnaires were given to the two transport companies. In Company 1, 103 responses out of 125 questionnaires (with a return rate of 82.4%) were achieved, and the usability rate was 97% as only three incomplete questionnaires were found. In Company 2, 100 responses out of 115 questionnaires (with a return rate of 87%) were returned, and the usability rate was 100%. After checking, overall usable questionnaires were 200 (out of 203) from two transport corporations, and the overall usability rate was 98%. Thus, the useable response rate was over 84%.

The questionnaire includes three dependable variables: skilled incompetence, defensive routines and fancy footwork. There were two items in each variable which was derived from [4], [28] and [20]. Four-point Likert-type scales were assigned to all variables of first group. These variables were anchored at (4) major influence; (3) moderate influence; (2) minor influence and (1) no influence.

One of purpose of this study was to test correlation among the three dependent variables. Correlation analysis was selected as the technique most fit for purpose [9], [6], [22]. The data were subject to analysis using SPSS Version 15.

Univariate analysis including frequency distribution was used to analyze the personal data of respondents. Following this, bivariate analysis including t-test was used to test the first hypothesis (H1a, H1b and H1c) - comparing the perceptions of influence of organizational defensive patterns of female and male engineering staff on learning of ICT. The samples of this research design were 41 female and 159 male, which fitted the minimum of what was acceptable for t-tests [10]. Afterwards correlation analysis was used to test the second hypothesis (H2a, H2b and H2c) based upon the relationships among three dependent variables: skilled incompetence, defensive routines and fancy footwork.

Results

Descriptive statistics were used to analyze the demographic data on respondents. Table 1 displays the demographic data on respondents in which 95.5% (male) and 100% (female) were working in the corporation more than one year. This indicated that most respondents had been exposed to the organizational environment and had been employed over the period of major ICT implementation. Of respondents, 4% (male) and 0.5% (female) were managers, with 96% (male) and 99.5% (female) at technical level, including engineers, assistant engineers, technicians and technical officers. This result also indicated that most of respondents were in roles in which they would encounter the effects of ICT implementation rather than initiating this implementation.

Bivariate analysis including t-test was then used to compare the perceptions of influence of organizational defensive patterns of male and female engineering staff on learning of ICT. The figures of mean, standard deviation and t-test are shown in Table 2.

Hypotheses 1a, 1b and 1c were used to test whether male engineering staff and female engineering staff in two transport companies have differences of the perception of influence of the organizational defensive patterns on learning of ICT. The findings are shown as follows:

Hypothesis 1a: This hypothesis was supported because there was significant difference ($t=2.714$, $p<0.05$) between male engineering staff and female engineering staff on the perception of influence of skilled incompetence on learning of ICT. In addition, female engineering staff had lower perception (mean=2.96, SD=0.48) than their male counterparts (mean = 2.98, SD = 0.51).

TABLE 1 STATISTICS OF THE PERSONAL DATA OF RESPONDENTS

Personal Details	No. of respondents			Percentage of respondents (%)		
	Male	Female	Overall	Male	Female	Overall
Years in present firm						
Less than one	9	0	9	4.5	0	4.5
Within range between 1 and below 3	63	15	78	31.5	7.5	39
Within range between 3 and below 6	20	25	45	10	12.5	22.5
Within range between 6 and below 10	44	1	45	22	0.5	22.5
10 or above 10	23	0	23	11.5	0	11.5
Job position						
Manager	8	1	9	4	0.5	4.5
Engineer	80	20	100	40	10	50
Assistant engineer	18	10	28	9	5	14
Technician	41	10	51	20.5	5	25.5
Supervisor/technical officer	12	0	12	6	0	6
Job function						
Administration/Management	11	1	12	5.5	0.5	6
Engineering	51	30	81	25.5	15	40.5
Maintenance	97	10	107	48.5	5	53.5

Hypothesis 1b: This hypothesis was supported because there was significant difference ($t = 3.512$, $p < 0.01$) between male engineering staff and female engineering staff on the perception of influence of organizational defensive routines on learning of ICT. Moreover, female engineering staff had lower perception (mean = 2.95, SD = 0.47) than their male counterparts (mean = 2.99, SD = 0.49).

Hypothesis 1c: This hypothesis was supported because there was significant difference ($t = 2.506$, $p < 0.05$) between male engineering staff and female engineering staff on the perception of influence of fancy footwork on learning of ICT. Besides, female engineering staff had lower perception (mean = 2.95, SD = 0.49) than their male counterparts (mean = 2.97, SD = 0.52).

Correlation analysis was then used to test the

relationship among three dependable variables: skilled incompetence, defensive routines and fancy footwork. The relationships among three variables are shown in Table 3.

TABLE 2 MEAN, STANDARD DEVIATION AND T-TEST FIGURES OF THREE DEPENDENT VARIABLES

Items	Mean (Standard Deviation)				Mean difference	t	df	Sig.
	Male (N=159)		Female (N=41)					
Skilled incompetence	2.98	0.51	2.96	0.48	0.02	2.714*	198	0.02
Defensive routines	2.99	0.49	2.95	0.47	0.04	3.512*	198	0.003
Fancy footwork	2.97	0.52	2.95	0.49	0.02	2.506*	198	0.015
t-test is significant at *p<0.05, **p<0.01, ***p<0.001 level (2-tailed)								

Hypotheses 2a, 2b and 2c were used to compare the differences of the relationships among skilled incompetence, defensive routines and fancy footwork for male and female engineering staff. The findings are shown as follows:

Hypothesis 2a: The predicted less positive relationship between skilled incompetence and defensive routines for female engineering staff ($r = 0.547$, $p < 0.01$) than their male counterparts ($r = 0.602$, $p < 0.01$) was supported. In addition, there was positive empirical relationship between skilled incompetence and defensive routines for male engineering staff ($r = 0.602$, $p < 0.01$) and female engineering staff ($r = 0.547$, $p < 0.01$).

Hypothesis 2b: The predicted less positive relationship between skilled incompetence and fancy footwork for female engineering staff ($r = 0.102$, $p < 0.05$) than their male counterparts ($r = 0.125$, $p < 0.05$) was supported. In addition, there was positive empirical relationship between skilled incompetence and fancy footwork for male engineering staff ($r = 0.125$, $p < 0.05$) and female engineering staff ($r = 0.102$, $p < 0.05$).

Hypothesis 2c: The predicted less positive relationship between defensive routines and fancy footwork for female engineering staff ($r = 0.142$, $p < 0.05$) than their male counterparts ($r = 0.167$, $p < 0.05$) was supported. In addition, there was positive empirical relationship between defensive routines and fancy footwork for male engineering staff ($r = 0.167$, $p < 0.05$) and female engineering staff ($r = 0.142$, $p < 0.05$).

In sum, the above findings showed that all hypotheses were supported. This is a major finding in itself, and is notable for its consistency. Firstly, the findings showed that female engineering staff and male engineering staff in two transport corporations had differences in

the perceptions of influence of skilled incompetence, defensive routines and fancy footwork on learning of ICT. Secondly, the findings also indicated that (1) skilled incompetence, defensive routines and fancy footwork were less positively associated with each other for female engineering staff than their male counterparts.

TABLE 3 CORRELATION AMONG VARIABLES

Variables	(1)		(2)		(3)	
	Male	Female	Male	Female	Male	Female
(1) Skilled incompetence	1	1	0.602**	0.547**	0.125*	0.102*
(2) Defensive routines	0.602**	0.547**	1	1	0.167*	0.142*
(3) Fancy footwork	0.125*	0.102*	0.167*	0.142*	1	1
Correlation is significant at * $p < 0.05$, ** $p < 0.01$						

Discussions

This research mainly investigated the following two research questions:

- (1) Did male and female engineering staff in two transport companies have differences in the perception of influence of the organizational defensive patterns on learning of ICT?
- (2) Were skilled incompetence, organizational defensive routines and fancy footwork less correlated with each other for female engineering staff than their male counterparts in two transport companies?

In response to the above research questions, I undertook quantitative surveys in two transport engineering groups. Detailed discussion will be addressed in following paragraphs.

- (1) Did male and female engineering staff in two transport companies have differences in the perception of influence of the organizational defensive patterns on learning of ICT?

This study supported the prediction that male and female engineering staff in two transport companies had different perceptions of influence of the organizational defensive patterns on learning of ICT. Moreover, the finding supported the evidence shown by researchers [4], [28] that organizational defensive patterns, *in varying degrees*, impede the learning in all human organizations, including private and public organizations, trade unions, voluntary organizations, universities and schools, as well as families. In

addition, female engineering staff had lower said perceptions than their male counterparts because female owner-managers liked to empower organizational learning and knowledge transfer [8], and women liked to use organizational learning as a way to innovate, deal with change and develop than their male counterparts [23].

- (2) Were skilled incompetence, organizational defensive routines and fancy footwork less correlated with each other for female engineering staff than their male counterparts in two transport companies?

This study supported the prediction that skilled incompetence, organizational defensive routines and fancy footwork were less positively associated with each other for female engineering staff than their male counterparts. This finding supported the evidence by Martin [23] that women liked to use organizational learning as a way to innovate, deal with change and develop than their male counterparts. In addition, skilled incompetence, organizational defensive routines and fancy footwork were positively associated with each other. The finding also supported the evidence shown by Argyris [4] that skilled incompetence, organizational defensive routines and fancy footwork coexisted and reinforced each other.

Conclusions

As this research investigated the learning process of information and telecommunication technologies of transport companies in Hong Kong, the findings would be most valuable in the Hong Kong context but not necessarily in other countries. This of course was also a limitation of the study, as its generalizability was limited by it being a sectorally and geographically specific study.

In addition, Hong Kong is a city with a small population, where employers tend to acquire technologies from other countries rather than developing its own technologies by establishing research and development teams. This issue greatly affects the types of technologies available to be employed in the corporation.

In addition, due to safety reasons within the transport companies, the information and telecommunication technologies employed must be mature in nature rather than too advanced in nature so as to avoid unnecessary risk. As a result, research of more advanced information and telecommunication

technologies cannot be easily conducted in transport companies.

Finally, the sample size of women ($n = 41$) taking for this survey was small because not many women liked to join engineering profession in Hong Kong. This was also a limitation of this study.

Despite these limitations, there are two research opportunities which can emanate from this research study. The first is to test the same theories within another female group in transport companies. This would contribute to the development of knowledge in this sector and would motivate researchers into pursuing meaningful research in the area. The second research opportunity is to apply the same theories in other sectors, in organizations of different size and/or geographic location. This would serve to test the applicability of the theory in other environments, thereby enhancing generalizability of results if they were consistent.

In this paper I presented an in-depth quantitative empirical study of two Hong Kong transport companies where those companies adopted new ICT from other companies.

There were three implications for practice: (1) The findings strongly suggested that organizational defensive patterns definitely formed in any type of organizations as indicated by Argyris [4]. (2) The findings strongly suggested that it was not easy to eliminate any one mechanism of organizational defensive patterns once they were in existence in two transport companies as three mechanisms reinforced each other. (3) The findings strongly suggested that organizational defensive patterns hindered female and male engineering staff to learn new ICT from other companies.

The contribution of this research comes from the relationships testing among skilled incompetence, defensive routines and fancy footwork, generated from the survey study of the two Hong Kong's transport corporations. These two companies were suited for the study as they employed similar information and telecommunication technologies at the time of data collection for this research. Furthermore, both organizations had sufficient experience with employing such technologies and developing a thorough understanding of the issues of organizational defensive patterns. Indeed, both organizations appeared to be facing similar problems in the areas of organizational learning barriers. The new framework

developed in this research contributes to our knowledge as it is the first, empirically-based theory testing study about organizational defensive patterns of transport corporations in Hong Kong.

In conclusion, (1) organizational defensive patterns, *in varying degrees*, impeded male and female engineering staff to learn new ICT in two Hong Kong transport companies; (2) skilled incompetence, defensive routines and fancy footwork were less positively associated with each other for female engineering staff than their male counterparts in two transport companies; (3) the stronger the one mechanism of organizational defensive patterns, the stronger the other two mechanisms. As a result, skilled incompetence, organizational defensive routines and fancy footwork coexisted and reinforced each other in two transport companies.

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Author Introduction

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